

DRAFT (interim)
ADVISORY CIRCULAR

AIRCRAFT WIRING SYSTEMS TRAINING PROGRAM

1. PURPOSE.

This Advisory Circular (AC) provides guidance for developing an enhanced wiring systems training program. The guidance in this AC is based on recommendations submitted to the FAA from the Aging Transport Systems rulemaking Advisory Committee (ATSRAC). The guidance and recommendations in this AC are derived from the best practices training developed through extensive research by ATSRAC Industry Working Groups 5 and 8. This AC is an effort by the FAA to officially endorse these best practices and to dispense this information industry wide so the benefits of this information can be effectively realized. Adoption of the recommendations in this AC will result in a training program that will improve the awareness and skill level of the aviation maintenance personnel in wiring system maintenance, inspection, alterations and repair. This AC promotes a philosophy of training for all personnel who come into contact with aircraft wiring systems as part of their job and tailors the training for each workgroup to their particular needs.

2. APPLICABILITY.

This AC provides acceptable, but not inclusive, means of complying with the Federal Aviation Regulations. The information in this AC is based on lessons learned by joint FAA, JAA, ATSRAC, and industry, manufacturers and airline working groups. The recommendations in this AC can be applied to any aircraft maintenance training program.

3. RELATED 14 CFR PARTS. [FAA](#)

- a. Part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration
- b. Part 91, General Operating and Flight Rules.
- c. Part 119, Certification: Air Carriers and Commercial Operators.
- d. Part 121, Operating Requirements: Domestic, Flag, and Supplemental Operations.
- e. Part 125, Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 pounds or More.

- f. Part 129, Operations: Foreign Air Carriers and Foreign Operators of U.S.-Registered Aircraft Engaged in Common Carriage.
- g. Part 135, Operating Requirements: Commuter and On-demand Operations.
- h. Part 145, Repair Stations

4. RELATED READING MATERIAL. [FAA](#)

a. Advisory Circulars (ACs).

- (1) AC 20-37D Aircraft Metal Propeller Maintenance.
- (2) AC 25-16 Electrical Fault and Fire Protection and Prevention.
- (3) AC 25.981-1B Fuel Tank Ignition Source Prevention Guidelines
- (4) AC 43-3 Nondestructive Testing in Aircraft.
- (5) AC 43-4A Corrosion Control for Aircraft.
- (6) AC 43-7 Ultrasonic Testing for Aircraft.
- (7) AC 43-12A Preventive Maintenance.
- (8) AC 43.13-1A Acceptable Methods, Techniques and Practices- Aircraft Inspection and Repair.
- (9) AC 43.13-1B Acceptable Methods, Techniques and Practices for Repairs and Alterations to Aircraft.
- (10) AC 43-204 Visual Inspection For Aircraft
- (11) AC 65-15A Airframe & Powerplant Mechanics Airframe Handbook, Chapter 11. Aircraft Electrical Systems

b. Reports.

- (1) Aging Systems Task Force Aging Transport Systems Task 1 and Task 2 Final Report.
- (2) Transport Aircraft Intrusive Inspection Project, Final Report.

- (3) Aging Transport Systems Rulemaking Advisory Committee, Task 3 Working Group, Final Report.
- (4) The Standard Wiring Practices Task 4 Working Group, Final Report.
- (5) Aircraft Wiring Systems Training, Task 5 Working Group, Final Report.
- (6) ATA Specification 117 (Wiring Maintenance Practices/Guidelines).
- (7) National Transportation Safety Board, Safety Recommendation, September 19, 2000, A-00-105 through -108.
- c. Other Documents.
 - (1) ATA Operator/Manufacturer Scheduled Maintenance Development as revised, ATA Maintenance Steering Group (MSG-3), may be obtained from the Air Transport Association of America; Suite 1100: 1301 Pennsylvania Ave, NW; Washington, DC 20004-1707.
 - (2) Handbook Bulletin 91-15 "Origin and propagation of inaccessible aircraft fire under in-flight airflow conditions."

5. DEFINITIONS.

HIRF/ Lightning (see MSG3 2001 definition)

Inspection - Detailed (DI) An intensive examination of a specific item, system installation or assembly to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may be required.

Inspection - General Visual (GVI). (2001 definition)

Inspection - Special Detailed (SDI) An intensive examination of a specific item, installation, or assembly to detect damage, failure or irregularity. The examination is likely to make extensive use of specialized inspection techniques and/or equipment. Intricate cleaning and substantial access or disassembly procedures may be required.

Inspection - Zonal A collective term comprising selected General Visual Inspections and visual checks that is applied to each zone, defined by access and area, to check system and power plant installations and structure for security and general condition.

Inspection - Enhanced Zonal (new definition MSG3 2001)

Maintenance. As defined and described in 14 CFR §1.1 “maintenance” means “...inspection, overhaul, repair, preservation, and the replacement of parts....” Within the context of this advisory circular, it also includes preventive maintenance as described in both part 1.1 and part 43, Appendix A(c).

Maintenance Significant Item (MSI). Items identified by the manufacturer whose failure could result in one or more of the following:

- a. could affect safety (on ground or in flight).
- b. is undetectable during operations.
- c. could have significant operational economical impact., and/or
- d. could have significant non- operational economic impact.

Non-destructive wire testing (NDT).
(see **SDI**)

Swarf. British term for metal particles, generated from drilling and machining operations. Such particles may accumulate on and between wires within a wire bundle.

6. BACKGROUND.

The NTSB has recommended that the FAA address all wiring issues identified in the Aging Systems Plan, either through rulemaking or through other means. The NTSB specifically cited the need for improved training of maintenance personnel to ensure adequate recognition and repair of potentially unsafe wiring conditions.

To address the issues identified in the Aging Systems Plan, in 1998 the FAA established the Aging Transport Systems Rulemaking Advisory Committee (ATSRAC). The ATSRAC provides the forum for the airlines, manufacturers, and other regulatory authorities to make recommendations to the FAA based on the Aging Systems Plan. This advisory circular captures, in FAA guidance form, the aircraft wiring systems training program developed by ATSRAC working groups. This includes a lessons plan, curriculum, training target groups and a matrix outlining training for each target group.

7. OBJECTIVE.

The objective of this wiring maintenance training program is to give the operators or maintenance repair organizations a guideline for the development of their own wiring maintenance training program.

This program was developed for six different target groups and may be used for the minimum requirements for initial and recurrent training (see training matrix). The target groups are:

- 1 Qualified staff performing wire maintenance
(e.g. FAA: electricians/avionics
JAA: Cat A or B2)
- 2 Qualified staff performing maintenance inspections on wiring systems
(e.g. FAA: Inspectors
JAA: Cat B2)
- 3 Qualified staff performing electrical/avionic engineering on in service aircraft
(e.g. FAA/JAA: electric/avionic engineers)
- 4 Qualified staff performing general maintenance/inspections not involving wire maintenance.(LRU change is not considered wire maintenance)
(e.g. FAA: A/P mechanics
JAA: Cat A or B1)
- 5 Qualified staff performing other engineering or planning work on in service aircraft
(e.g. FAA/JAA: . mechanical/structures engineers or production planning control staff)
- 6 Other service staff with duties in proximity to wire
(e.g. FAA/JAA: cleaners, cargo loaders, servicing personnel)

Depending on the duties some may fall into more than one target group and therefore must fulfill all objectives of the associated target groups.

8. ESSENTIAL ELEMENTS FOR WIRING SYSTEMS TRAINING PROGRAM.

a. Initial Training.

Initial training should be conducted for each designated work group.

The initial training for each designated work group is outlined in Wiring Systems Minimum Initial Training Program - Appendix A. Curriculum and Lesson Plans for each dedicated module are included in Appendix B.

The most important criteria is to meet the objectives of the Lesson Plans – Appendix B. The method of reaching the objectives should be at the discretion of the training organization.

b. Refresher Training

Refresher training should be conducted in a period not to exceed two years. It could consist of a review of previously covered material plus any new material or revisions to publications. Refresher training will follow the Wiring Systems Minimum Initial Training Program - Appendix A for that particular target group.